CLAIMS

1. A transparent conductive film for use in a transparent touch panel in which a lower electrode (5) and an upper electrode (4) are stacked so as to be spaced from each other by spacers (10), the transparent conductive film being provided on an electrode substrate (14, 15) of at least one of the electrodes and thereby forming the electrode, wherein

the transparent conductive film has, in its surface shape, an arithmetic mean roughness (Ra) within a range of 0.4 nm ≤ Ra ≤ 4.0 nm and a root-mean-square roughness (Rms) within a range of 0.6 nm ≤ Rms ≤ 3.0 nm.

2. A transparent conductive film for use in a transparent touch panel in which a lower electrode (5) and an upper electrode (4) are stacked so as to be spaced from each other by spacers (10), the transparent conductive film being provided on an electrode substrate of at least one of the electrodes and thereby forming the electrode, wherein

the transparent conductive film is composed of an indium oxide - tin oxide film and a mean crystal grain size (R) within a plane of a metallic oxide observed at a surface of the transparent conductive film is within a range of 40 nm ≤ R ≤ 200 nm.

3. A transparent conductive film for use in a transparent touch panel in which a lower electrode (5) and

an upper electrode (4) are stacked so as to be spaced from each other by spacers (10), the transparent conductive film being provided on an electrode substrate of at least one of the electrodes and thereby forming the electrode, wherein

the transparent conductive film is composed of a fluorine- or antimony-added tin oxide film and a mean crystal grain size (R) within a plane of a metallic oxide observed at a surface of the transparent conductive film is within a range of 80 nm ≤ R ≤ 400 nm.

4. A transparent conductive film for use in a transparent touch panel according to Claim 1 or 2, wherein the transparent conductive film is composed of an indium oxide - tin oxide film and has, in its surface shape, an arithmetic mean roughness (Ra) within a range of 0.4 nm ≤ Ra ≤ 3.0 nm and a root-mean-square roughness (Rms) within a range of 0.6 nm ≤ Rms ≤ 2.0 nm.

5. A transparent conductive film for use in a transparent touch panel according to Claim 1 or 3, wherein the transparent conductive film is composed of a fluorine- or antimony-added tin oxide film and has, in its surface shape, an arithmetic mean roughness (Ra) within a range of 0.4 nm ≤ Ra ≤ 4.0 nm and a root-mean-square roughness (Rms) within a range of 0.6 nm ≤ Rms ≤ 3.0 nm.

6. A transparent conductive film for use in a transparent touch panel according to any one of Claims 1 to

5, wherein given a center line depth Rp and a maximum roughness Rmax with respect to the surface shape, a parameter (Rp/Rmax) representing the surface shape is set to 0.55 or less, whereby a cross section of grain aggregates forming the surface shape is formed into a trapezoidal or rectangular shape.

7. A transparent conductive film for use in a transparent touch panel according to any one of Claims 1 to 6, wherein the transparent conductive film is formed by a coating or printing process with a sol-gel material.

8. A transparent touch panel in which the transparent conductive film according to any one of Claims 1 to 7 is provided on an electrode substrate of at least one electrode out of the lower electrode (5) and the upper electrode (4) and thereby forming the electrode.

9. A transparent touch panel in which the transparent conductive film according to any one of Claims 1 to 7 is provided on electrode substrates of both the lower electrode (5) and the upper electrode (4) and thereby forming the electrodes.

10. A method for fabricating a transparent conductive film for use in a transparent touch panel in which a lower electrode (5) and an upper electrode (4) are stacked so as to be spaced from each other by spacers (10), the transparent conductive film being provided on an electrode

substrate (14, 15) of at least one of the electrodes and thereby forming the electrode, the method comprising:

forming an indium oxide - tin oxide film so that the film has, in its surface shape, an arithmetic mean roughness (Ra) within a range of 0.4 nm ≤ Ra ≤ 3.0 nm and a root-mean-square roughness (Rms) within a range of 0.6 nm ≤ Rms ≤ 2.0 nm, by a coating or printing process using a sol-gel material, where at least an organometallic compound constituting the sol-gel material is composed of indium and tin and has a constituent weight ratio of indium to tin that 5 wt% ≤ {Sn/(In+Sn)}×100 ≤ 15 wt%.

11. A method for fabricating a transparent conductive film for use in a transparent touch panel in which a lower electrode (5) and an upper electrode (4) are stacked so as to be spaced from each other by spacers (10), the transparent conductive film being provided on an electrode substrate (14, 15) of at least one of the electrodes and thereby forming the electrode, the method comprising:

forming an indium oxide - tin oxide film so that a mean crystal grain size (R) within a plane of a metallic oxide observed at a surface of the film is within a range of 40 nm ≤ R ≤ 200 nm, by a coating or printing process using a sol-gel material, where at least an organometallic compound constituting the sol-gel material is composed of indium and tin and has a constituent weight ratio of indium to tin

that $5\ wt\% \le \{Sn/(In+Sn)\}\times 100 \le 15\ wt\%$.

12. A method for fabricating a transparent conductive film for use in a transparent touch panel in which a lower electrode (5) and an upper electrode (4) are stacked so as to be spaced from each other by spacers (10), the transparent conductive film being provided on an electrode substrate (14, 15) of at least one of the electrodes and thereby forming the electrode, the method comprising:

after coating or printing with a sol-gel material by a coating or printing process using the sol-gel material, performing an initially drying process; then performing an oxidation burning process at a temperature increasing rate of 40°C - 60°C per minute within a temperature range of 200°C - 400°C; and subsequently performing a reduction burning process, thereby forming an indium oxide - tin oxide film so that the film has, in its surface shape, an arithmetic mean roughness (Ra) within a range of $0.4\ nm \le Ra \le 3.0\ nm$ and a root-mean-square roughness (Rms) within a range of $0.6\ nm \le Rms \le 2.0\ nm$.

13. A method for fabricating a transparent conductive film for use in a transparent touch panel in which a lower electrode (5) and an upper electrode (4) are stacked so as to be spaced from each other by spacers (10), the transparent conductive film being provided on an electrode substrate (14, 15) of at least one of the electrodes and

thereby forming the electrode, the method comprising:

after coating or printing with a sol-gel material by a coating or printing process using the sol-gel material, performing an initially drying process; then performing an oxidation burning process at a temperature increasing rate of 40°C - 60°C per minute within a temperature range of 200°C - 400°C; and subsequently performing a reduction burning process, thereby forming an indium oxide - tin oxide film so that a mean crystal grain size (R) within a plane of a metallic oxide observed at a surface of the film is within a range of 40 nm ≤ R ≤ 200 nm.

~~14. A method for fabricating a transparent conductive film for use in a transparent touch panel according to Claim 10 or 11, wherein when the transparent conductive film is formed by the coating or printing process using the sol-gel material, the method comprising:~~

~~after coating or printing with the sol-gel material, performing an initially drying process; then performing an oxidation burning process at a temperature increasing rate of 40°C - 60°C per minute within a temperature range of 200°C - 400°C; and subsequently performing a reduction burning process, thereby forming the transparent conductive film.~~

~~15. A transparent conductive film for use in a transparent touch panel fabricated by the method for~~

fabricating a transparent conductive film for use in a transparent touch panel according to any one of Claims 10 to 14.

add a